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STUDIES IN THE LIFE HISTORY OF TRACHYCHELE BLONDELI MARS. (COLEOPTERA)*

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In connection with the investigative work on Trachychele damage to western red cedar, it became expedient to make a study of the life history of the species, *Trachychele blondeli* Mars., which has become very troublesome to pole operators on the Coast of British Columbia. Accordingly a study of the life history was started by the writer in 1925. In the fall of that year and during the spring and summer of 1926, the seasonal history was studied and observations were made on emergence, egg laying, and breeding habits. The exact length of time spent in the larval state is still uncertain.

An ideal location for study was found at Pender Harbor, B.C. Here there are some areas of heavy infestation and, in addition, a fire which occurred about two miles from the harbor in the summer of 1925, severely burned the bases of many large cedars, causing them to fall about a month after the fire was extinguished. Thus the tops remained green and fresh and, since many of them were heavily infested, they provided excellent material for study.

In September, 1925, six live adults were cut from these fallen trees, all from the tops. Many larvae were also found but no pupae. One adult, cut out on September 14th, had obviously just transformed, as part of the pupal case still adhered to it; the elytra were very soft, the abdomen distended and still showing white on the sides. September 15th probably marked the extreme end of the pupal period that season.

The first pupae were obtained on July 18, 1926; others were cut out during the latter part of that month, one finally on August 1st. Pupae may be found between July 15 and September 15; none were found previous to July 18th, while larvae are numerous at all times of the year.

In determining what time the adults emerged in the spring, cages were employed. Three infested trees were felled and sawed into lengths. Cages were erected above them, each cage consisting of a pole frame work covered with the best quality cheese cloth. The two smaller trees were enclosed by a single cage, No. 1. The largest tree was 14 inches in diameter and 69 feet in length. The cage enclosing this tree, No. 2, was 18 feet long, 5 feet 6 inches wide, and 5 feet 8 inches high.

Another cage, No. 3, was constructed, completely enclosing the crown of a standing living cedar. This tree was known to be infested by the presence of exit holes in several parts of the crown. The cage was built upon a platform

*—Contribution from the Division of Forest Insects, Entomological Branch, Dept. of Agriculture, Ottawa.

placed around the trunk at a distance of 13 feet from the ground. The base of the cage was 5½ feet by 5½ feet and the height was 16 feet, the extreme top of the tree being removed.

The first adult was taken from cage No. 3 on May 12th. This was a female found clinging to the top of the cage. The fresh exit hole was found on the side of the main stem near the top of the cage. On May 14th, two more adults, both males, were taken from this cage. The fresh exit holes of these were also located on the trunk up in the crown. Cage No. 1 yielded a male on May 19th and cage No. 2, a female on June 5th. No adults were taken in the cages after June 5th. This established the period of emergence as between May 10th and June 10th under these conditions.

Immediately after the adult was taken in the crown cage I commenced systematically to climb the cedars in the vicinity of the cages to see if adults could be found on the foliage. On June 2nd an adult male was sighted resting on the foliage near the top of a tree. This specimen was taken for the collection. The beetles are very difficult to distinguish as they are the exact color of the foliage upon which they spend almost their entire lives as adults. On June 6th, three Trachychele adults were observed resting on the foliage in the crown of the same tree. These were not molested. They crawled about on the foliage for a time and at length took wing, flying to a nearby tree top.

On June 7th, a large female was located in the top of another tree, resting on a spray of foliage near the top.

She was observed for some time, but perhaps because of a strong wind did not move about much. No more adults were found until June 12th and then only a glimpse of one as it flew from a spray of foliage to the opposite side of the tree.

Both males and females fly freely from tree to tree, always alighting on the foliage. Mating apparently takes place as soon as the sexes can locate each other after emergence. The males are much more active than the females and seem to fly more freely. The female becomes especially quiet prior to egg laying.

On June 14th a large female was sighted at 2 p.m., resting on a spray of foliage four feet from the trunk, on a branch 42 feet from the ground and 15 feet from the top of the tree. She remained motionless for some time then crawled to the end of the spray and fed upon the tender tips of the foliage. After feeding, she crawled about from one spray to another on the same branch, resting for long periods. At 5 p.m. she was resting on some foliage near the outer end of the branch. I suspect that this was the same female sighted on June 7th as she was on the same mass of foliage and identical in appearance. While watching her a male landed about 2 feet from her on some foliage. He crawled about for a bit and then took wing, accidentally flying into a spider's web. Here he struggled for a time and at length managed to free himself, dropping into a mass of foliage below.

From this time up to June 21st, this female, apparently, remained upon the same branch. She was observed during each entire day of that period and her actions noted under various weather conditions ranging from a cold rain to bright warm sunlight. She was most active on sunny days, crawling here and

there over the branch and sunning herself for long periods. She fed upon the foliage several times a day. Towards nightfall she generally sought shelter between two thick sprays of foliage where she was protected from the wind. Here she could always be found in about the same position on the following morning.

The forenoon of June 17th was showery and cold. She remained exposed until the first drop hit her, which caused her to flinch and quickly seek shelter between two thick sprays of foliage. These sheltered her from the rain remarkably well. On such rainy or cold days she remained almost motionless for hours at a time. June 21st was a warm sunny day. The female was observed throughout the morning. At 12 o'clock an hour was taken for lunch. On returning at 1 p.m. the female could not be found anywhere on the branch. For a moment it appeared as though she had gone completely, but as I was descending the tree, probably the same female was seen on one of the larger lower limbs, resting near the main trunk. Sensing something moving she remained motionless with sheathed ovipositor for some time. Then she commenced to crawl toward the main trunk protruding her ovipositor, which moved from side to side and pried under the little flakes of bark apparently seeking deep enough apertures in which to lay. Finally she found one, inserted her ovipositor, and remained motionless for several moments. Presently the base of the ovipositor expanded suddenly as the egg passed along it. After depositing the egg she seemed to work her ovipositor this way and that in the opening as though plugging the entrance with bark particles. Upon this limb she found two places suitable for laying. She then climbed a foot higher by crawling up the trunk. In this manner she visited four limbs all on the south east side of the tree and always proceeding up the tree so that the last limb upon which she laid was the highest. This was 38 feet from the ground and 7 feet above the first limb. Counting all the limbs, eggs were deposited in nine different places. Five of these were marked for future examination in hatching and four were examined immediately. In most places but one egg was deposited, but in one place six were found touching each other.

The total number of eggs could therefore be estimated at between 15 and 20. The eggs were all laid on the upper side of the branches, sometimes a little down on the side, none of them over three feet from the trunk and generally within one foot from it. They were placed as deeply as possible beneath the bark, near the cambium.

While crawling up the trunk between limbs the ovipositor was not extruded except once when the female came upon a small knot. Here she hunted for some time for apertures in which to lay, but finding none suitable, she continued to the next limb. This indicates that eggs are sometime deposited on the main trunk, but probably always in the crown. The beginnings of galleries have been found there but never below the lowest living limb.

The female ceased her laying operations at 5.30 p.m. and crawled to some nearby foliage where she fed ravenously for some time. She did not begin to lay again until 10.30 the following morning. By noon of that day she clearly showed by her actions that the egg laying was finished.

The egg is white, not intensely so, but rather with a slight ash gray tone. It is oblong, 2.5 mm. long by 1.75 mm. in diameter, evenly rounded at one end bluntly pointed at the other and completely covered with a venous net work. The cells formed by this net work are most commonly hexagonal, but many irregular ones occur here and there.

Examination of the eggs on June 29th and again on July 3rd revealed no signs of hatching. On July 11th we examined one of the marked places and found that one of the eggs had hatched, indicating that the incubation period is approximately 18 days.

It is improbable that any egg laying takes place later than July 15th since no adults could be found after that date.

The newly hatched larva is 2.75 mm. long. The width of the thorax is 1 mm. The young larva extends its tunnel back and forth in the limb for a time and then enters the trunk, where it may work in any direction. The time spent in the tree is at least three years. Five adults have been cut from pupal cells in material which had been on the ground for that length of time. It is probable that the adults lay only in the crowns of living trees since they have never been found below the crowns except when cut out of fallen material which was infested previous to falling.

The full grown larva is 37 to 40 mm. long and 6 to 8 mm. across the thorax. It is pure white with the exception of the mandibles, which are black, and the labium and labrum, which are light yellowish brown. The body is strongly compressed so that the thickness of the prothorax is only 3 to 4 mm. A characteristic feature of this larva is the horseshoe-shaped depression on the dorsal side of the prothorax. From this depression two slightly diverging fine light brown lines extend to within a short distance of the posterior margin. On the ventral side this depression becomes a small pit and the two brown lines are parallel and much closer together.

Larvae are found in all parts of a tree above the ground level. The full grown larva bores out nearly to the surface wherever it happens to be when ready to pupate. Pupae are found in all sections of the trunk and sometimes out in the larger limbs, generally not more than a foot from the trunk. Exit holes are commonly found on all parts of the trunk and often on limbs a few inches or even a foot or so from the trunk.

The pupa is from 16 to 22 mm. long and 6 to 8 mm. wide. It is entirely white with the exception of the eye spots which are pinkish brown, and differs little in form from other members of the family of Buprestidae.

From our studies thus far conducted the seasonal history may be summarized tentatively, as follows:

1. Emergence of adults, May 10 to June 10. 2. Egg laying, June 15 to July 15. 3. Period of incubation, 14 to 20 days. 4. Larval period, at least three years. 5. Pupal stage, late July to the middle of August. 6. Adults, remain in pupal cells from September to May of the following year.

NOTES ON SYRPHIDAE (DIPTERA.)*

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In Volume 69, Articles 9 and 11, of the Proceedings of the United States National Museum, R. C. Shannon has reviewed certain Syrphid genera Apparently some of the synonymy cited is erroneous and I present some notes indicatating certain inconsistencies. It is well to point out that Shannon has not taken the trouble to examine types of species outside those found in the British Museum, Museum of Comparative Zoology, Cambridge, and the United States National Museum. Had he done so I feel sure that his conclusions in some cases would have been different.

Xylota lovetti Curran.

Shannon has placed *oregona* Curran as a synonym without having females for examination. *X. lovetti* was described by Lovett under the name *bivittata* and is characterized by two weak, dark vittae on the mesonotum. In *oregona* there is no trace of vittae and the mesonotum is mostly black-haired while the black hair is almost wanting in *lovetti*. Moreover, Lovett forwarded the type specimens to me under the name *subfasciata* Loew and it is *oregona* and not *subfasciata* which is referred to by both Lovett and Shannon as having been reared from the decayed heart of fir.

One of the main reasons for believing *lovetti* and *oregona* to be distinct is the fact that these specimens were in Lovett's collection at the time he described *bivittata* and unless there is much greater dimorphism than is the case in other species, the two are certainly distinct. It seems very strange that Shannon should not mention the vittate thorax and the color of the pile in his description and that he should state that the type is in the "University of Oregon," when Lovett gives its location as California Academy of Sciences, together with the type number, in the original description.

Chrysotoxum Meigen.

The characters used by Shannon for the separation of the species belonging to this genus are somewhat different from those which I employed (Can. Ent., LVI, 34-40, 1924) and for this reason different results are obtained. Some of the synonymy, however, is quite impossible. On page 11, "*Chrysotoxum coloradense* Greene, Curran" is placed as a synonym of *C. integer* Williston with the reference "Can. Ent., Vol. 56, 1924, p 30, (in part)." In the paper cited this species appears only in the key on page 35.

On page 11 Shannon places *C. currani* Wehr and *cuneatum* Wehr as synonyms of *pubescens* Lw. and also *luteopilosum* Curran Since I examined both these species I feel confident in stating that neither of them is the same as my *luteopilosum* which I have accepted as a synonym of *pubescens* although Loew's statement that the second antennal segment is twice as long as the first is an exaggeration and does not appear in Cent. V. I am of the opinion that at least one of the two species described by Wehr is the same as one of those described by Johnson (*plumeum* and *perplexum*) and either one or both of the names applied by Johnson will fall to those used by Wehr.

*—Contribution from the Division of Systematic Entomology, Entomological Branch Dept. of Agriculture, Ottawa.

No reference is made to *C. integrum willistoni* Curran, a form which traces to *ypsilon* in Shannon's key but is at once distinguished by the very narrow Y on the fifth segment.

Shannon separates *laterale* Lw. from *fasciolatum* DeGeer as follows: "Second antennal joint shorter than the first." Loew states in his description: "Antennarum articulus secundus primo longior!" Moreover, it is stated that only the female is known while Loew's description was from a male! The Canadian National Collection contains three males and four females of this species from Manitoba and Nebraska. In this collection are also two females of *derivatum* Walker, without data, but probably from northern Ontario.

Chrysotoxum minor n. sp.

Related to *plumeum* Johnson, to which it traces in Shannon's key. It is distinguished by its small size, 9.5 to 10 mm., the presence of only sparse, pale hair on the first three sternites, black haired pteropleura in the male, much narrower pale apical segmental fasciae and much more extensive black pile on the abdomen and thorax. The femora are usually very broadly brown or black basally. The arcuate, narrowly interrupted pale fasciae are well separated from the lateral margins or reach them very narrowly.

Holotype.— ♂, Husavick, Man., July 5, 1910, (J. B. Wallis); No. 2451 in the Canadian National Collection, Ottawa.

Allotype.— ♀, Husavick, July 1, 1910.

Paratypes.— ♂, Anticosti Island, Aug. 10, 1923, (F. Johannsen); ♀, Spruce Grove, July 21, 1904.

Chrysotoxum columbianum n. sp.

Related to *plumeum* Johnson but at once distinguished by the length of the antennae which are much longer, the relative lengths of the segments being 1-1-3. The second to fifth abdominal segments are clothed with sparse, coarse, short appressed black hair behind the arcuate yellow bands and the segments bear black setulae on the sides posteriorly. Legs wholly yellowish. The posterior borders of the sternites are broadly pale and the third to fifth each bears a pair of elongate oval pale spots. The costal border is luteous with an elongate oval brown spot towards the apex. Brown hairs are intermixed with the pale ones on the mesonotum. The scutellum has the disc grayish black, the pile black. There is a very narrow pale posterior border to the second tergite, that on the third broader and widened medianly while on the fourth it is very wide in the middle, tapering laterally. The arms of the long, narrow Y diverge strongly near their ends.

Type.— ♀, Vernon, B. C., July 21, 1923, (D. G. Gillespie); No. 2452 in the Canadian National Collection, Ottawa.

Paratype.— ♀, same data.

Chrysotoxum coloradense Greene.

There are four females in the Canadian National Collection, one from Colorado, one from Alberta, and two from British Columbia, which I refer here. None of the specimens will agree fully with Greene's description and in three of them the arcuate abdominal bands do not attain the lateral margins on the intermediate segments although they are not interrupted in the middle. The two British Columbian specimens have the legs yellow, a very broad preapical band on the

posterior femora and the tarsi wholly reddish. This is a quite variable species insofar as abdominal color is concerned and at the same time a readily recognized form.

In conclusion I must point out that the presence of a broadly interrupted yellow posterior fascia on the second abdominal sternite is of absolutely no value in separating species since it is an extremely variable character.

THE LEPIDOPTERA OF THE SETON LAKE REGION, BRITISH COLUMBIA.*

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(Continued from page 199)

HADENINAE

Barathra configurata Wlk. One ♀, June 21.

Anarta macleani n. sp.

♀. Eyes small, ciliate; palpi light ochreous with rough dark hairs; vestiture of head and thorax rough, hairy, dark gray; abdomen light gray with yellow terminal tuft. Primaries pale yellowish, heavily sprinkled with black, producing a dull olivaceous appearance; maculation distinct; t. a. line heavy, black, upright, forming three moderate outcurves of which the central one is the largest, t. p. line dentate, excurved below costa, then inwardly oblique to inner margin with slight incurve below cell, faintly marked outwardly with pale yellow; median shade diffuse, oblique from costa across reniform, then close and parallel to t. p. line; orbicular moderately large, round, pale-filled, outlined in black; reniform rather narrow, upright, partially outlined in black and obscured by median shade; subterminal and terminal areas rather evenly dark smoky; s. t. line obscure, pale, rather even, emphasized by slight smoky preceding shade; fringes blackish in basal half, cut opposite veins by pale ochreous, paler smoky in outer half. Secondaries pale whitish-ochreous with broad smoky terminal band, the pale area slightly sprinkled with smoky and with a large discal lunule; fringes with basal half dark smoky, cut by ochreous, outer half whitish. Beneath pale whitish ochreous, slightly sprinkled with smoky especially along costa and termen and with a prominent discal lunule on each wing; fringes as above. Expanse 30 mm.

Holotype—♀, Mt. McLean, B. C., July 12 (J. McDunnough); No. 1583 in the Canadian National Collection, Ottawa.

The species bears considerable resemblance to the *infuscata* group of *Lasiestra* in type of maculation of primaries; the pale secondaries with prominent discal lunule and the smaller size separate it however; I can find no description under *Anarta* at all applicable.

Lasiestra luteola Sm. Not uncommon on the slopes of Mt. McLean above timber-line on July 12, but difficult to capture.

Polia discalis Grt. Two ♀, July 13.

Polia subjuncta G. & R. Several rather worn specimens in late June and early July; most of these show but little carneous shading and come closest to var. *eleanora* B. & McD.

Polia nevadae Grt. One very worn ♀, June 25.

Polia radix Wlk. One ♀, June 28.

Polia ingravis Sm. One ♀, June 28.

Polia farnhami Sm. One very worn ♀, June 28.

Polia cristifera Wlk. Two worn ♀, June 23, July 8.

Polia pulverulenta Sm. One worn ♀, June 29.

Polia delecta B. & McD. What I take to be this species or at least a form of same was extremely common all through June; if my memory of the type series is correct the Seton Lake series is rather smokier in color but the maculation agrees with that of the figure; *noverca* Grt. has similar maculation and is possibly only a lighter colored form from the eastern and southern portion of the Rockies.

Polia anguina larissa Sm. One ♀, June 3.

Polia vicina acutipennis Grt. All though June specimens of a *vicina* form came to light which I think may be referred to *acutipennis* Grt., described from a ♀ from Nevada. The description calls for rather dark primaries with blackish suffusion in the median area and some of my specimens agree in this respect excellently; others are rather duller in color with indistinct maculation but this is partially due to the age of the individual. Apart from the generally darker color there is no marked difference between my Seton Lake series as a whole and eastern specimens of *vicina* and the genitalia seem identical; Hampson makes the two names synonymous, but for the present I use *acutipennis* for the western dry-belt form.

Polia pensilis Grt. One ♂, three ♀, June 25, 26, July 14. As compared with the series of the preceding species these specimens are lighter in color with distinct brown shades in the median area and more pale filling in the orbicular and reniform; the maculation is very similar and the only distinction I can point to is the fact that the t. p. line seems to be more deeply and sharply indented opposite the claviform in *pensilis;* the ♂ genitalia show the species to be a distinct one from *vicina* and its forms. My specimens agree with a Vancouver Island specimen which has been compared with the type by Wolley-Dod.

Polia lorea Gn. Common throughout June.

Polia olivacea lucina Sm. Three ♂, four ♀, June 2, 3, 6, 15, 30, July 5, 10.

Polia restora Sm. Extremely common all through June and early July and very variable. In some specimens, notably males, the ante and postmedian areas of forewing are pale green, in others, principally females, more or less black suffusion is present until in certain specimens the wing appears blackish with only the white filling of the lines and the outline of the reniform strongly contrasting. I am using the name *restora* as this was based on Kaslo specimens, but it seems likely that *restora* will fall to *alboguttata* Grt. judging by Hampson's figure of the type ♀ from Oregon which agrees closely with some of my darker specimens; it will be necessary also to work out the relation of this form to *illaudabilis* Grt.; this latter name was based on material from California and Vancouver Island and judging by a couple of specimens from this latter locality before me must be very close to *restora,* if not identical. Smith's genitalic figures of the differences between *illaudabilis* and *restora* are not very convincing.

Eriopyga irrorata Sm. One ♀, June 27.

Eriopyga discreta B. & McD. From the middle of June on, what appears to be this species came very commonly to light; I have not had opportunity to examine specimens from the type locality but my Seton Lake males agree structurally with Modoc Co. and Truckee, California specimens so that the identity is fairly certain.

Eriopyga infidelis Dyar. Almost as common in June as the preceding species; most of the specimens were rather more suffused with dark smoky on primaries than our Kaslo series.

Eriopyga uniformis Sm. Common in late June and July; my specimens agree with Kaslo specimens in the Candian National Collection determined as this species by Wolley-Dod. Judging by the ♂ genitalia this is merely a Western form of *furfurata* Grt.

Eriopyga mecrona Sm. Common during the latter half of June. My series agrees with Kaslo specimens determined by Wolley-Dod. According to the ♂ genitalia *mecrona* is only a rather doubtful race of the southern *fractura* Sm. The color of primaries varies from deep flesh-color to dull smoky gray and the median dark shade is at times very heavy.

Cirphis roscola Sm. Not uncommon toward the middle of July.

Cirphis multilinea Wlk. One ♂, July 8.

Cirphis anteroclara Sm. One ♂, one ♀, July 13, 14.

CUCULLIINAE

Copicucullia culcpis Grt. One ♀, June 22.

Oncocnemis phairi n. sp.

♂. Palpi dull ochreous, head and base of tegulae dark smoky, upper half of tegulae paler, more ochreous, with two faint transverse dark lines; thorax smoky with slight admixture of pale scales. Primaries pale ochreous with a heavy sprinkling of blackish scales which causes the wings to appear deep smoky gray with a slight olivaceous tinge; maculation clean-cut and sharp; basal half-line obscure, black; t. a. line black, single, slightly oblique and irregular, with a rather prominent outward angle in submedian fold; median shade-line heavy, blackish, outwardly oblique to lower edge of reniform which it touches and then irregular, parallel and close to t. p. line; t. p. line faintly geminate, the inner line and the pale filling most distinct, well excurved around reniform, incurved in submedian fold, dentate on the veins; orbicular recumbent, oval, pale filled, faintly outlined with black; reniform broad at base with inner lower portion well outlined in black and outer concavity more faintly so, scarcely paler than the ground-color; claviform represented by a couple of faint black dashes beyond the bulge of the t. a. line; s. t. very irregular and rather prominent, marked by pale dashes bordered inwardly by a blackish shade-line which forms slight dashes below costa and above vein three; a faint broken terminal black line; fringes smoky with pale dots at base. Secondaries pale smoky with a deep smoky terminal band, veins partially outlined in dark; fringes smoky, tipped with white and with a light ochreous basal line. Beneath primaries pale smoky, sprinkled in apical area with ochreous and with indications on costa of postmedian line; secondaries dull creamy with black sprinkling in costal area and a dusky postmedian line and terminal band; a small discal dot; veins partially outlined in smoky. **Expanse 30 mm.**

Holotype—♂, Lillooet, B. C., August 25, 1921 (A. W. A. Phair), No. 1581 in the Canadian National Collection, Ottawa.

This species, sent in several years ago by Mr. Phair for identification has the same type of maculation as *glennyi* Grt. according to Hampson's figure, but entirely lacks all the red brown shades of primaries; it falls into the *lepipoloides* group.

Oncocnemis parvanigra Blkmre. Two ♀, June 8, 28.

Oncocnemis extremis Sm. One ♀ of this striking species came to light July 4; it was described from a specimen labelled "N. W. Brit. Col.," one of the old Neumoegen labels used apparently for material collected along and south of the C. P. R. main line, certainly not north-west British Columbia as we now know it.

Oncocnemis youngi McD. One ♀, July 8, which agrees excellently with the unique type from Departure Bay, British Columbia.

Oncocnemis umbrifascia Sm. Rather common during the latter half of June and early July.

Oncocnemis major Grt. Four ♀, June 7, 24, July 5, 14. These are all of a dark unicolorous blue-gray color on primaries with little indication of maculation; they seem to fit in best with the typical form judging by Hampson's figure.

Homohadena infixa fifia Dyar. Quite common in late June and early July. My series shows great variability in the distinctness of the transverse lines, the specimens in general presenting a rather suffused dark appearance, due to considerable black shading in the median and terminal areas. I believe that *dinalda* Sm. should be removed from the synonymy and the name applied to the prairie race in which the maculation is much more cleanly cut and the ground color a rather even brown-gray.

Pseudanarta crocea Hy. Edw. I took no specimens but there are several in the Canadian National Collection from Lillooet taken by W. B. Anderson late in August.

Eumichtis miniota Sm. One ♂, ♀, June 7, July 7, which, pending a further study of the species of this genus, I place here on account of the brown tinges on primaries, not found in *versuta* Sm.

Sympistis zetterstedti labradoris Staud. Several specimens were taken on Mt. McLean above 6000 ft. on July 12.

ACRONICTINAE

Amphipyra pyramidoides Gn. One ♀, July 1.

Septis antennata purpurissata B. & McD. Two ♀, June 3, 29. Not quite so much suffused with purplish as typical Vancouver Island specimens but best placed here, I believe.

Septis auranticolor sora Sm. One ♂, three ♀, July 5, 14. I am using this name for our Canadian form which has frequently been called *barnesi*. *Sora* was described from Calgary specimens and there is a co-type in the Canadian National Collection; this northern race is very variable but in general is darker and duller in color than either the typical red-brown form or the yellow-brown *barnesi* from the Yellowstone region; in some specimens there is considerable whitish suffusion subterminally whilst in others the primaries are almost uni-

colorous smoky brown; the co-type before me is intermediate in this respect and is closer to *barnesi* than most of our series.

Septis castanea Grt. One ♀, July 8. Approaching *arctica* in type of coloration. It is quite possible that the two are merely forms of one species.

Trachea spaldingi Sm. One ♀, June 5.

Trachea indirecta Grt. Two ♂, one ♀, July 1, 8.

Trachea perfumosa Hamp. Four ♂, one ♀, June 21, 23, 26, 28, 30. These agree with specimens under this name from Truckee, California in the Canadian National Collection. I must confess I can find no definite points of distinction between these specimens and the Colorado *fumosa* Grt.

Trachea binotata Wlk. Four ♂, two ♀, June 12, 23, July 1, 13.

Trachea adnixa Grt. One of the commonest Noctuids of this region all through June.

Trachea characta Grt. Not uncommon in June. My specimens all belong to the rather unicolorous dark form which is apparently the typical one; *erica* Sm. from Utah is much paler and suffused with gray; *luteocinerea* Sm. from Montana, which I believe is only a form of this species, shows considerable yellow tinges in the ante and postmedial areas, culminating in *pluraloides* McD. of the prairie region which is pale gray and ochreous with the t. a. and t. p. lines obsolete.

Oligia violacea columbia var. nov.

♀. Differs from typical *violacea* in the rather deeper color of the tints of the primaries and the narrower reniform; the thorax, including the tufting, is pale greenish gray with slight black sprinkling and with none of the orange-brown shades of the typical form; the abdomen is dark gray with deep smoky tufting and the hind wings are tinged outwardly quite noticeably with pinkish with slight smoky sprinkling in the fringes, whereas in *violacea* they are pure white.

Holotype—♀, Seton Lake, B. C., July 1, (J. McDunnough); No. 2558 in the Canadian National Collection, Ottawa.

Paratype—♀, Duncan, Vancouver Island, (Coll. Livingston).

Oligia tonsa Grt. One ♀; July 13.

Agroperina dubitans Wlk. Two ♂, July 4, 8.

Taeniosea discivaria Wlk. One ♂, July 8.

Sidemia longula Grt. One ♀, July 14.

Sidemia devastator Brace. One ♂, July 13.

Chytonix divesta Grt. Three ♂, one ♀, July 13, 14; rather grayer than Vancouver Island specimens and possibly referable to the form *laticlava* Sm.

Proxenus mendosa n. sp.

Very similar to *mindara* B. & McD. but slightly deeper in the shade of the primaries, these being a rather dull smoky brown with a slight ochreous tinge. The black dot representing the orbicular in *mindara* is absent and the reniform, when present at all, is represented by a small, obscure, pale lunule, defined on inner side by a faint smoky shade. The hind wings in both sexes are pale smoky, not white as in *mindara*. The ♂ genitalia agree with *mindara* and differ from *miranda* in having very heavy pencils of hair at the base of the tegumen; in *mindara*, however, the harpe is more or less mushroom-shaped with terminal

spine from the dorsal side whilst in *mendosa* it is drawn out to a sharp terminal spine; the armature of the aedoeagus is much more complicated in *mendosa*; both species show a bundle of long cornuti, but, whereas in *mindara* there is only a single further bundle of four or five short spines apically, in *mendosa* we have in addition a short pointed spine and two curved chitinous plates terminating in bundles of spines; the arms of the juxta are also much more widely separated in *mendosa*.

Holotype—♂, Kaslo, B. C., June 11, 1903, (J. W. Cockle); No. 2580 in the Canadian National Collection, Ottawa.

Allotype—♀, same locality and collector, June 1.

Paratypes—Two ♂, same locality, one undated, other May 17, 1906; one ♀, same locality and collector May 20, 1904; one ♀, Kaslo, B. C., July 26 (Bush-Wilson Coll.); two ♀, Seton Lake, B. C., July 8, 14, (J. McDunnough).

It might be noted that *mindara* occurs at Oliver, B. C.; there is a small series in the Canadian National Collection collected by C. B. Garrett.

Acronicta innotata griseor Dyar. One ♀, June 21.

Acronicta radcliffei Harv. One ♀, July 3; rather darker than Eastern specimens; may be var. *vancouverensis* Strand based on Hampson's "Ab. 1."

Acronicta mansueta Sm. Not uncommon in June.

Acronicta grisea revellata Sm. One ♀, June 3.

Acronicta strigulata Sm. One ♀, July 8.

Acronicta perdita Grt. One ♀, June 3.

Andropolia aedon Grt. Not uncommon in late June and July.

Hyppa xylinoides Gn. One ♂ ♀ July 13; these agree with Calgary specimens which Wolley-Dod apparently regarded as a western race of this species.

Platyperigea anotha Dyar. Two rather worn ♀, July 5, 12.

Caradrina meralis Morr. One ♂, ♀, July 2, 13.

Caradrina extima Wlk. Two ♀, June 28, July 2.

Platysenta discistriga Sm. One ♀, June 22.

Namangana albimacula B. & McD. Two ♂, June 25, 28.

Ipimorpha nanaimo Barnes. One ♂, July 13. A little deeper in color than typical specimens with a more rigidly oblique t. p. line, but I think the same species. *Nanaimo* lacks the peculiar modification of vein two of secondaries found in the other species.

Enargia decolor form *infumata* Grt. One ♂, June 28.

ERASTRIINAE

Phobolosia anfracta Hy. Edw. Four specimens, June 29, July 8.

EUTELIINAE

Marathyssa inficita Wlk. Two ♂, two ♀, June 3, 28, 30, July 4.

SARROTHRIPINAE

Sarrothripus revayana lintnerana Speyer. Two specimens, June 29, July 1 and one specimen of the form *cinereana* N. & D., June 23.

CATOCALINAE

Catocala nevadensis Beut. One ♂, July 14; the species was evidently just beginning to appear at this date.

Zale minerea norda Sm. One ♀, May 27.

PLUSIINAE

Syngrapha ignea Grt. Not uncommon on Mt. McLean on July 12.

Autographa ampla Wlk. Two ♂, June 24, July 8.

Autographa selecta Wlk. One ♀, June 21.

Autographa rectangula nargenta Ottol. One ♂, June 28.

EREBINAE

Raphia frater Grt. One ♂, three ♀, June 3, 15, July 2, 3. Scarcely darker than our eastern specimens.

Melipotis versabilis Harv. One ♀, June 6.

Syneda nichollae Hamp. What I take to be this species came quite commonly to light during June and early July and I also took a specimen at D'Arcy, Anderson Lake, June 17. My specimens fit Hampson's description fairly well, except that what he calls "red-brown" I should call "smoky-brown" but the paler color may be due to the age of the British Museum specimens. The species is close to *sabulosa* Hy. Edw. but best distinguished by the even concavity of the t. p. line below cell without the slight outward bulge in the submedian fold.

Syneda hudsonica G. & R. Not uncommon in late June.

Syneda adumbrata Behr. Not rare in late May and early June; one specimen, rather larger and duller, taken July 2.

Scoliopteryx libatrix L. Two specimens, June 24.

HYPENINAE

Mycterophora longipalpata Hlst. One ♂, two ♀, July 5, 14.

Spargaloma sexpunctata Grt. One ♀ taken at D'Arcy, Anderson Lake on June 17.

Camptylochila americalis Gn. One ♀, July 8.

Camptylochila acmula Hbn. Not uncommon in late June.

Camptylochila lubricalis Geyer. One ♂, June 6.

Epizeuxis jacchusalis Wlk. One ♂, July 2.

Renia caradrinalis Gn. Common in June and July.

Bomolocha toreuta Grt. One ♀, June 8.

PERICOPIDAE

Gnophaela latipennis vermiculata G. & R. Several specimens on the way up Mt. McLean at about 4000 ft. on July 11.

NOTODONTIDAE

Ichthyura apicalis Wlk. Not uncommon in June; the specimens are rather larger than eastern ones and may possibly be best referred to *bifiria* Hy. Edw. but I have no specimens of this race for comparison.

Nadata gibbosa oregonensis Butl. One ♂, ♀, June 7, 12.

Ianassa semirufescens Wlk. One ♂, ♀, July 2, 5. Rather duller in color than eastern specimens and with very indistinct maculation. This is evidently the *perangulata* of the Kaslo list but from this species it is distinguished by the presence of a blackish shade on internal margin at base of forewing. There are several specimens in the Canadian National Collection from Kaslo which agree with my Seton Lake specimens; two males from Agassiz, however, are much brighter in color and more like eastern specimens; evidently there is considerable variation in the species.

Schizura unicornis S. & A. Common in June.

Cerura scolopendrina Bdv. Two ♀, June 27, July 8. These would probably fall under *pluvialis* Dyar but according to Benjamin (Contr. V, 182) this is only a very minor variation of *scolopendrina*.

Cerura cinerea paradoxa Behr. One ♂, two ♀, June 26, July 2, 13. The ♂ matches Packard's figure of one of Behr's types very closely; the females show more distinct median banding and would probably fall under *placida* Dyar which is merely a form of *paradoxa*, picked out from some of Behr's specimens, and should not stand as a race.

THYATIRIDAE

Habrosyne chatfeldi Grt. One ♀, July 27. Probably only a western race of *scripta* Gosse and scarcely distinguishable.

Pseudothyatira cymatophoroides form *expultrix* Grt. Not rare in late June.

Euthyatira semicircularis griseor B. & McD. Not rare in late May and the first half of June. Some of the specimens are very dark.

LYMANTRIIDAE

Olene vagans willingi B. & McD. One ♂, July 5.

LASIOCAMPIDAE

Malacosoma disstria erosa Stretch. Two ♂, July 6, 8.

DREPANIDAE

Drepana arcuata siculifer Pack. One ♀, June 3.

(To be continued)

RECORDS AND DESCRIPTIONS OF CRANE-FLIES FROM ALBERTA (TIPULIDAE, DIPTERA). I.*

BY CHARLES P. ALEXANDER,
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In the present report, I have begun the consideration of the very extensive collections of crane-flies from Alberta that have been received from the Canadian National Collection, through Mr. Curran; the very extensive series collected by Mr. Owen Bryant; a series from Banff, collected by Mr. Garrett; and the collections of the University of Alberta, sent through the kindness of Professor Strickland. I wish to express my sincere thanks to all of the above mentioned gentlemen for this kind co-operation in making known the Tipulid fauna of Alberta, a list that will certainly exceed in numbers that of any other of the Canadian Provinces with the single exception of British Columbia.

In this paper, the collections made by Mr. Bryant in the plains country east of the mountains are considered. The chief collections were made at Edmonton, Bilby and on the Lesser Slave Lake. The numerous specimens labelled "Bilby" were taken at and near Bilby, 30 miles west of Edmonton, on the edge of the spruce and tamarack "Muskeg" country. The Slave Lake collections were made on the southern side of the Lesser Slave Lake. In this connection I quote Mr. Bryant as follows: "Bilby lies on a small lake about one and one-half miles long. This lake is rather shallow, with a muddy beach on the south side and a heavy stand of very large poplars growing nearly to the water's edge. Among the big poplars

*—Contribution from the Department of Entomology, Massachusetts Agricultural College.

are about half a dozen cottages used as a summer resort by Edmonton people. These poplars cast a dense shade, supporting a rank herbaceous growth, together with a few shrubs, as dogwoods, gooseberries, and others. Most of the large Tipulids were picked from the walls of the cottages, while others were obtained by sweeping this rank herbage. To the west is a spruce "Muskeg" and closer to the lake, a bog with cowslips and some reeds, partly shaded by trees. Southwest of the lake are some open "Muskegs" with scattered larches growing in deep sphagnum. West of the lake are thickets of young lodge-pole pine, with a few larger individuals."

"Lesser Slave Lake; collections made along the lake (altitude about 1800 feet). The Grizzly Mt. is the edge of a plateau forming the Swan Hills; on the mountain are forests of small spruce and some "Muskeg"; collections were made at approximately 3000 feet."

Most of the collections were thus made in the transition belt of poplar-savanna that forms such a large portion of north-central Alberta (*Naturalist's Guide to the Americas*, pp. 254-255; 1926). Nearly 70 species are recorded in the present paper, chiefly from Bilby. Many of the records add vastly to the known distribution of our eastern North American Tipulidae. The facies of the fauna is overwhelmingly eastern, almost all of the species being found in north-eastern North America. A very few species (*Tipula barbata* Doane, *T. ingrata* Dietz, *T. commiscibilis* Doane, *T. pendulifera* Alex.) are members of the Rocky Mountain fauna, occurring in the mountains, as far south at least as Colorado. Others (as *Nephrotoma altissima* O.S., *Tipula appendiculata* Loew) have a more extensive range in western and north-western North America. A few are apparently more confined to the plains country of the central Provinces (as *Ptychoptera metallica* Walk., *Prionocera sordida* Loew, *Limonia dietziana*, n.n., *Limnophila harperi* Alex.). The western element is best shown by the occurrence of *Tricyphona constans* (Doane). The limits of distribution of the species herein described as new cannot be discussed at the present time but all will unquestionably have a much wider range than known at the present time.

I am very greatly indebted to Mr. Bryant for the privilege of retaining the types of the species described as new. A nearly complete collection of the species discussed herewith has been returned to Mr. Bryant.

PTYCHOPTERIDAE

Ptychoptera metallica Walk. Two specimens, Bilby, July 14-16, 1924. Originally described from St. Martin's Falls, Albany R., Ontario, but unrecognized in collections since the date of publication (1848).

TRICHOCERIDAE

Trichocera maculipennis Meig. Edmonton, May 21, 1924.

TIPULIDAE

TIPULINAE

Prionocera fuscipennis (Loew). Bilby, July 28, 1924.
Prionocera sordida (Loew). Bilby, June 8, 1924.
Prionocera dimidiata (Loew). Bilby, June 11-August 5, 1924.

Nephrotoma altissima (O.S.). Calgary, May 30, 1924; Bilby, July 3-August 1, 1924, the latter on fire-weed. I do not believe that *N. erythrophrys* (Will.) can be separated from *altissima*, being obviously a variant showing erythrism to a greater or less degree.

Nephrotoma ferruginea (Fabr.). Bilby, July 3-21, 1924.

Nephrotoma pedunculata (Loew). Bilby, July 7, 1924.

Nephrotoma occipitalis (Loew). Bilby, June 8-July 4, 1924.

Tipula pachyrhinoides Alex. Lesser Slave Lake, August 17-25, 1924.

Tipula mainensis Alex. Lesser Slave Lake, August 14-17, 1924.

Tipula umbrosa Loew. Lesser Slave Lake, August 14-25, 1924.

Tipula barbata Doane. Edmonton, September 3-5, 1924.

Tipula penobscot Alex. Bilby, July 3, 1924.

Tipula entomophthorae Alex. (*similissima* Dietz). Bilby, June 8-July 14, 1924.

Tipula variata sp. n.

General coloration light gray, the praescutum with four brown stripes; wings relatively long and narrow; distal section of R_2 atrophied; male hypopygium with the ninth tergite much as in *T. angulata* Loew, having a very weak median tooth at the base of the notch.

Male.—Length about 13 mm.; wing, 14.2 mm.

Female.—Length, 17-18 mm.; wing, 16 mm.

Allied to *T. subfasciata* Loew in the atrophied distal section of vein R_2 and the general nature of the wing-pattern, differing especially in the details of venation and the structure of the hypopygium.

Male with the basal three antennal segments obscure yellow; remaining segments weakly bicolorous, the basal enlargement being brownish black, the distal portion of the segments ranging through light brown on the basal segments through darker brown, the terminal segments uniformly blackened.

Mesonotal praescutum light gray with four brown stripes, the intermediate pair entire, narrowly separated by a line of the ground color; lateral stripes with grayish centers; scutellum and postnotum paler gray, with a vague capillary brown median line. Pleura light gray, the dorso-pleural membrane pale yellow. Legs with the femoral and tibial tips narrowly darkened; tarsi darker brown. Wings relatively long and narrow; the angulate white band beyond the cord variable in amount, in most specimens nearly attaining the wing-margin in cell M_3. Venation: Distal section of R_2 atrophied, leaving only a weak basal spur.

Abdominal tergites obscure yellow with a conspicuous median black stripe that widens out behind to include most of the outer segments, these being margined caudally with yellowish and more broadly laterally with whitish gray; sternites obscure yellow, darker outwardly, the caudal margins of the segments yellowish; hypopygium dark. Male hypopygium with the ninth tergite relatively large, the caudal margin with a U-shaped median notch, as in *angulata*, the lateral lobes thus formed broadly truncated; a very weak median tooth at the base of the notch. Inner dististyle large, the tips conspicuously blackened.

The female is similar but the shorter antennae show little of the bicolorous condition of the male. Abdominal tergites more evidently trivittate with brown.

Holotype, ♂, Bilby, June 29, 1924 (*Owen Bryant*).

Allotopotype, ♀, June 29, 1924.

Paratopotypes, ♂ ♀, June 1-July 4, 1924.

Tipula angulata Loew, *T. huntsmaniana* Dietz and other similar species have the distal section of R_2 preserved.

Tipula albertensis sp. n.

Male.—Length about 13-14 mm.; wing, 14-14.6 mm.

Female.—Length about 16 mm.; wing, 15 mm.

Closely related and similar to *T. angulata* Loew, differing as follows:

Antennal flagellum beyond the first segment uniformly dark brown, the segments only feebly incised. Praescutal stripes very indistinct, the intermediate pair widely separated from one another. Wings with the angulate post-stigmal fascia not quite reaching the posterior wing-margin. Distal section of R_2 entirely preserved, with a few macrotrichiae at extreme base. Male hypopygium with the caudal margin of the ninth tergite nearly transverse, the median portion with a small to very small circular emargination that bears a small triangular tooth at the base; tergite dark brown in color, the median portion pale.

Holotype, ♂, Bilby, July 12, 1924 (*Owen Bryant*).

Allotopotype, ♀, July 4, 1924.

Paratopotypes, 3 ♂ ♂, July 4, 1924.

Tipula latipennis Loew. Bilby, July 4-12, 1924.

Tipula ingrata Dietz. Bilby, July 4-12, 1924.

Tipula grata Loew. Bilby, July 3, 1924.

Tipula appendiculata Loew. Bilby, July 14, 1924. Dietz does not include this species in his treatment of the *hebes* group (Trans. Amer. Ent. Soc., 40: 345-363; 1914) and it is almost certain that *T. derelicta* Dietz, described from Alaska, is a synonym.

Tipula athabasca sp. n.

Belongs to the *hebes* group; general coloration of the thoracic dorsum gray, the pleura yellow; flagellum unicolorous; wings brownish yellow, unmarked except for the stigma; abdomen obscure yellow, the tergites with a median brownish black stripe.

Male.—Length, 11 mm.; wing, 12.5 mm.

Female.—Length, 16 mm.; wing, 12.8 mm.

Frontal prolongation of the head yellow, relatively short; palpi obscure yellow, the terminal segment blackened at base. Antennae of moderate length, in male, if bent backward, extending about to the base of the halteres; scapal segments yellow; flagellum brown to dark brown, in cases the first segment brownish yellow. Head brownish gray, the vertical tubercle and the occiput obscure yellow.

Pronotum obscure yellow, darker medially. Mesonotal praescutum yellowish gray in front, darker behind, with four darker brown stripes, the lateral pair margined internally with a darker brown line, the anterior end of which curves around the anterior end of the stripe to form a crook; scutum light gray, the lobes variegated with darker gray; scutellum dark gray medially, the sides and the parascutella yellow; postnotal mediotergite brown medially, yellowish

laterally. Pleura obscure yellowish, the dorso-pleural membrane clearer yellow. Halteres brown, the base of the stem and the apices of the knobs yellowish. Legs with the coxae brownish yellow; trochanters obscure yellow; femora brownish yellow, the tips narrowly dark brown; tibiae brown, the tips a little darker; tarsi dark brown, the terminal segments blackened. Wings with a strong brownish yellow tinge, the base and costal region brighter yellow; stigma yellowish brown; veins dark brown, the obliterative areas extensive. Venation: Sc_2 opposite midlength of Rs; distal section of R_1 pale but evident; distal section of R_2 entirely preserved, with macrotrichiae on the basal half; petiole of cell M_1 about one-fourth the cell, subequal to m; m-cu at the fork of M_{3+4}.

Abdominal tergites obscure yellow, with a distinct median brownish black to black stripe that is more or less interrupted, and less distinct, paler brown sublateral stripes; lateral margins of tergites broadly, the caudal margins more narrowly, buffy; sternites yellow; hypopygium brownish yellow, the tergite darker brown. Male hypopgium large and conspicuous. Ninth tergite tumid, the caudal margin gently emarginate, with a conspicuous median beak. Sternite and basistyle extensive, the apical appendage (lateral appendage of Dietz) produced into very extensive, thin, flattened plates, the free end terminating in acute pale points. Outer dististyle narrowed to the tip, strongly curved. Eighth sternite large, the caudal margin gently emarginate, the lateral portions with conspicuous brushes of long yellow setae. Ovipositor with the tergal valves long and straight, very slender, the margins smooth; sternal valves shorter, the tips obtuse.

Holotype, ♂, Bilby, July 14, 1924 (*Owen Bryant*).

Allotopotype, ♀, July 29, 1924.

Paratopotypes, 6 ♂ ♀, July 12-20, 1924.

This is the only Nearctic species of the *hebes* group in which the wings are immaculate except for the stigmal area.

T. macrolabis Loew. Bilby, July 3-20, 1924. Dr. Nathan Banks kindly informs me (February 1927) that there is but a single male type of *macrolabis* in the Loew Collection, this having been designated as the lectotype of the species. This specimen has the long arm of the basistyle smooth, without spines. This selection of the type-specimen of *macrolabis* makes *macrolaboides* Alex. (Can. Ent., 50:69; 1918) a synonym, leaving the species with spinous tips to the basistyles without a name. This latter is hereinafter discussed as *Tipula youngi*, sp. n. Both species have a great range in the Hudsonian and Canadian zones, the present species ranging from Alaska to Labrador, southward in the Rockies to New Mexico (at an altitude of 11000 feet.). *T. youngi* likewise has a very extensive range but is more confined to the northern and north-eastern portions of the continent.

T. youngi sp. n.

The distinctions between this species and *T. macrolabis* Loew have been given in detail in earlier papers (Crane-flies of New York, Part 1; Cornell Univ. Agr. Expt. Sta., Mem. 25:946-947, figs. 295, 296, 322, 323; 1919). The present species differs from *macrolabis* especially in the details of structure of the male hypopygium. The ninth tergite is rather squarely truncated across the caudal margin, with a sharp median tooth. Apex of the prolongation of the basistyle with two or three conspicuous spines.

Holotype, ♂, Bilby, July 2, 1924 (*Owen Bryant*).

Paratopotypes, 3 ♂ ♂, June 11-July 20, 1924.

Paratypes, ♂, Antioch, Illinois, June 13, 1920 (*Alexander*); Helderberg Mts., Albany Co., New York, July 3, 1915 (*Alexander*). ♂ Burks Falls, Ontario, July 12, 1926 (*F. P. Ide*); ♂, Severn, Ontario, July 4, 1926 (*C. H. Curran*).

The records of *Tipula macrolabis* for New York, New England and Ontario pertain to the present species.

This interesting crane-fly, one of the striking species in north-eastern North America, is named in honor of my friend, the late Mr. D. B. Young, Assistant Entomologist of New York for more than twenty years, to whom I am very greatly indebted for invaluable kindly advice and co-operation during my survey of the crane-flies of New York.

Tipula balioptera Loew. Bilby, June 28-July 12, 1924. This species and *centralis* Loew were formerly included in the *angustipennis* group of the genus (Crane-flies of New York, Part 1, p. 941; 1919) but the discovery of the female sex requires their transfer to the *arctica* group, with serrated valves to the ovipositor.

T. hinei Alex. Edmonton, June 17, 1924; Bilby, June 1-14, 1924.

T. canadensis Loew. Bilby, June 19-July 12, 1924.

T. angustipennis Loew. Edmonton, May 10-13, 1924; Calgary, May 31, 1924; Bilby, May 29-June 1, 1924.

T. serta Loew. Edmonton, May 10-June 5, 1924; Bilby, June 11-June 5, 1924.

T. senega Alex. Edmonton, May 10-June 22, 1924; Bilby, June 8-19, 1924.

T. fragilis Loew. Lesser Slave Lake, August 28, 1924. A pair taken and pinned *in copula*. I cannot separate these from eastern specimens of *fragilis*.

T. commiscibilis Doane. High River, July 15, 1921.

T. parvemarginata Alex. Calgary, May 30, 1924; Bilby, June 8-July 4, 1924; Lesser Slave Lake, August 17, 1924. This abundant material makes it very doubtful whether this species can be maintained as distinct from *T. kennicotti* Alex.

T. sulphurea Doane. Bilby, June 8-July 14, 1924.

T. pendulifera Alex. Lesser Slave Lake, August 14-17, 1924.

CYLINDROTOMINAE

Liogma nodicornis (O.S.). Bilby, June 19, 1924.

LIMONIINAE

Limonia triocellata (O.S.). Bilby, August 2, 1924; Lesser Slave Lake, August 17, 1924.

L. solitaria (O.S.). Bilby, June 26-August 5, 1924, the latter in the muskeg.

L. cinctipes (Say). Bilby, June 8-July 14, 1924.

L. dietziana, n.n. (for *Limonia gracilis* Dietz, described as a *Limnobia*, Can. Ent., 47: 329-330, fig. 27; 1915; *nec Limnobia gracilis* Wied., 1828). Edmonton, June 22, 1924; Bilby, June 18-26, 1924.

L. tristigma (O.S.), var. Lesser Slave Lake, August 17, 1924. Only the femoral tips are darkened and the specimens bear a marked resemblance to certain varieties of the Palaearctic *L. tripunctata* (Fabr.).

Rhipidia (*Rhipidia*) *maculata* Meig. Edmonton, September 3-27, 1924, flying

in spots of sunlight under heavy woods in hollow; Lesser Slave Lake, August 17, 1924; Bilby, June 19, 1924.

R. (*Monorhipidia*) *fidelis* O.S. Bilby, June 19-July 12, 1924; sits with body against board and legs fully extended.

Discobola argus (Say). Lesser Slave Lake, August 27-28, 1924.

Dicranomyia immodesta O.S. Edmonton, October 6, 1924; Lesser Slave Lake, August 17, 1924; Grizzly Mt., Lesser Slave Lake, altitude 3000 feet, August 15, 1924.

D. rostrifera O.S. Lesser Slave Lake, August 17, 1924.

D. decora (Staeg.). Lesser Slave Lake, August 17, 1924; Grizzly Mt., altitude 3000 feet, August 15, 1924. *D. terrae-novae* Alex., described as a vicarious Nearctic representative of this species, should be placed in the synonymy of *decora*, which has a vast range throughout the subarctic portions of the Holarctic Region.

Dicronomyia nycteris sp. n.

Male.—Length, about 4 mm.; wing, about 5 mm.

Very closely related to *D. morio* (Fabr.), of Europe, differing especially in the details of structure of the male hypopygium.

Terminal segment of antenna elongate, as in *D. caledonica* Edw., fully twice the length of the penultimate. Middle coxae black at base, the apical half yellow; posterior coxae yellow, the extreme base infuscated. Abdominal tergites black, the caudal margins of the intermediate segments paler, producing a weak bicolorous effect; intermediate sternites with the caudal margins conspicuously yellow, broadest on sternite three, narrowest on sternite five. Male hypopygium much as in *morio*, the lateral lobes of the tergite longer and more slender, narrowest just before the tips, the emargination of the tergite deep, transversely oval. Ventral dististyle bifid, as in *morio*, without the small rostral spine in the notch of the emargination. Gonapophyses long and slender.

Holotype, ♂, Bilby, June 8, 1924 (*Owen Bryant*).

This is the first record of occurrence in North America of any species closely allied to *D. morio*. *D. morioides* O. S. is a very different species.

Dicranomyia rufiventris neomorio subsp. n.

Male.—Length, about 5.2 mm.; wing, 6 mm.

Rostrum and palpi black. Antennae black throughout, with long verticils. Head dark, sparsely pruinose.

Pronotum dark, pruinose. Mesonotal praescutum shiny black, the scutum and scutellum paler; postnotum dark, pruinose. Pleura dark, pruinose; a paler longitudinal area across the dorsal sterno-pleurite and ventral portion of the anepisternum. Halteres pale, the knobs infuscated. Legs with the coxae and trochanters yellow, the fore coxae somewhat darker; femora yellow; tibiae more obscure yellow; tarsi passing into dark brown. Wings with a strong brown tinge; stigma oval, pale brown, only a little darker than the ground-color; veins darker brown; obliterative areas conspicuous. Venation: Sc_1 ending shortly before the origin of *Rs*, Sc_2 far from its tip, Sc alone being longer than *m-cu*; *Rs* angulated at origin; distal section of R_1 and basal section of R_2 both very faintly indicated; *r* better preserved than either of the latter, provided with macrotrichiae; cell

1st M_2 rather small, shorter than any of the veins beyond it; *m-cu* before the fork of M, longer than the distal section of Cu_1.

Abdominal tergites pale brown, the sternites yellowish; hypopygium pale. Male hypopygium with the dorsal dististyle a strongly curved sickle-shaped hook, narrowed gradually to the acute tip; ventral dististyle small, with the rostral prolongation large, its spine solitary, very long, terminating in a hair-like point. Ventral surface of aedeagus with a group of about six elongate setae, placed close together on the median line. Gonapophyses broad-based, the obtuse tips broadly blackened.

Holotype, ♂, Bilby, July 21, 1924 (*Owen Bryant*).

I cannot consider this as representing more than a slight geographical race of the European *D. rufiventris* Strobl (or at least of the material so determined by Lundstrom from Finland; it cannot be held as settled that Strobl's type, from Austria, is identical with the material so determined from northern Europe). In the present race, the dorsal dististyles are longer and the gonapophyses are blunter at their tips, but in all other characters the two flies are very close to one another. Like the last, no representative of this group of species had previously been recorded from North America.

Dicranomyia halterata O S. Bilby, June 22-July 14, 1924.

Dicranomyia athabascae sp. n.

Male.—Length, about 5.5 mm.; wing, 5.7 mm.

Closely allied to *D. sphegniola* Alex., differing in the details of structure of the male hypopygium

Rostrum obscure yellow; palpi with the terminal segments blackened. Antennae black throughout. Head brownish gray.

Pronotum dark brown medially, paler laterally. Mesonotal praescutum brown, with three darker brown stripes, the lateral margins and humeral region more yellowish. Pleura pale, the mesopleura darker, sparsely pruinose. Wings with cell 1st M_2 relatively large, rectangular.

Abdominal tergites brown, the sternites more yellowish. Male hypopygium very much as in *sphagnicola*. Ninth tergite apparently without the two small submedian groups of setae. Armature of the ventro-mesal face of the basistyle different, including an angularly bent blackened arm, the distal section of which is long and slender, with conspicuous setae at the angle; second lobe of basistyle not so conspicuously provided with golden-yellow setae as in *sphagnicola*. Dorsal dististyle and the rostral prolongation of the ventral dististyle longer and more slender. Gonapophyses of entirely different form, being large and conspicuous, the mesal apical region produced caudad into a long straight blade, the outer margin of which is conspicuously serrated.

Holotype, ♂, Bilby, June 26, 1924 (*Owen Bryant*).

D. haeretica O.S. Bilby, July 2-4, 1924.

Dicranomyia intricata sp. n.

General coloration dark, gray pruinose; pleura pale, the sternopleurite and anepisternum darker; halteres relatively short, pale, the knobs dark brown; wings grayish subhyaline, the stigma small; *m-cu* before the fork of M; abdomen dark brown, the basal sternites yellow; male hypopygium unusually large and compli-

cated in structure.

Male.—Length, 7-7.2 mm.; wing, 7.5 mm.

Rostrum pale brown, sparsely pruinose; palpi black. Antennae black, the flagellar segments oval. Head dark gray.

Pronotum black, the posterior lateral angles obscure yellow. Mesonotum dull black, sparsely dusted with yellow pollen, more evidently so on the sides of the sclerite; remainder of mesonotum black, the median area of the scutum, scutellum and base of the postnotal mediotergite narrowly obscure yellow. Pleura yellow, the sternopleurite and anepisternum variegated with dark brown, in cases more extensively so, the surface pruinose. Halteres of moderate length only, the basal half of the stem yellow, the remainder dark. Legs with the fore coxae darkened, the remaining coxae and the trochanters yellow; femora dark brown, the bases yellowish, more narrowly on the fore legs; tibiae and tarsi dark brown. Wings grayish subhyaline; stigma small, oval, dark brown; veins dark brown, the obliterative areas distinct. Venation: Sc_1 ending opposite the origin of *Rs*, Sc_2 some distance from its tip, Sc_1 alone being much longer than the stigma and a little longer than *m-cu*; *Rs* about two-thirds longer than the basal section of R_{4+5}; basal section of R_2 and distal section of R_1 pale; distal section of R_2 projecting as a small spur, provided with a few trichiae; cell 1*st* M_2 rectangular, longer than vein M_3 beyond it; *m-cu* about one-third to one-fourth its length before the fork of *M*.

Abdominal tergites dark brown, the caudal margins of the segments narrowly pale; sternites yellow, the subterminal segments dark with pale margins; hypopygium dark, the base black. Male hypopygium very complicated by supernumerary outgrowths which involve the basistyle and ventral dististyle (Fig. 1). Ninth tergite relatively small, the caudal margin with a U-shaped notch, the broad lateral lobes with conspicuous setae. Basistyle (b) relatively large, with a large conspicuous prolongation (1) on ventral face at base, this directed caudad, the longest arm dilated and longitudinally ribbed before the apex; the broad basal portion of the prolongation terminates in two much smaller lobes, one dilated into a setiferous head, the other a small stout tubercle. Two other very conspicuous arms seem to arise from the membrane between the ventral dististyle and the basistyle but it cannot be decided to which of these they are more intimately attached; one of these (2) is the longest arm of the organ, directed caudad, appearing as a long slender rod, dilated at apex, the whole suggesting the tail of a lion, the enlarged apex being clothed with longer and more conspicuous setae on one face than on the opposite one; the second of these arms is much smaller, appearing as a sickle-shaped rod that terminates in a recurved crest of spinous setae. From this same general region arises a short, clavate fleshy lobe, the large head provided with very long conspicuous setae. Dorsal dististyle (d) a feebly curved rod, the tip suddenly narrowed into an acute spine. Ventral dististyle (v) large and fleshy, with two conspicuous outgrowths besides the usual rostral prolongation. The first of these (a) is about as large and of somewhat the same shape as the rostrum, narrowed at base, the surface with conspicuous spinous setae; the second outgrowth is a smaller stout lobe that terminates in two very elongate stout setae. The rostral prolongation itself (r) is a long pale yellow blade, dilated at

apex, at near midlength with the two usual spines, these subequal in length, placed at about one-half their length apart.

Holotype, ♂, Lesser Slave Lake, August 17, 1924 (*Owen Bryant*).

Paratopotype, ♂; *paratype*, ♂, Grizzly Mt., Lesser Slave Lake, altitude 3000 feet, August 15, 1924.

Dicranomyia intricata belongs to a group of the genus that now includes a number of Holarctic species, such as *complicata* de Meij., *stigmatica* (Meig.), *cramptoni* Alex., *melleicauda* Alex., *platyrostra*, sp. n., and others. The structure of the very complicated hypopygia of these species readily separates them.

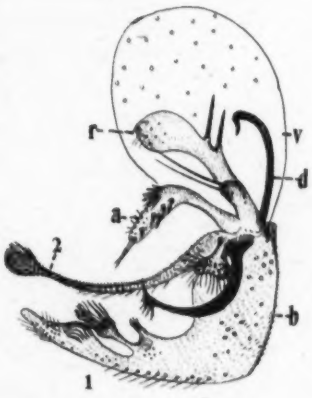

Fig. 1

Fig. 2

Fig. 1. *Dicranomyia intricata*, sp. n.; male hypopygium. b=basistyle; 1=ventral prolongation of same; 2=second appendage; d=dorsal dististyle; a=outgrowth; r=rostral prolongation; v=ventral dististyle.

Fig 2. *Dicranomyia platyrostra*, sp. n.; male hypopygium. b=basistyle; d=dorsal dististyle; v=ventral dististyle; g=gonapophysis; t=ninth tergite; 2A=Enlargement of ventromesal portion of ventral dististyle.

Dicranomyia platyrostra sp. n.

General coloration dark, gray pruinose; wings with a pale brown tinge, the stigma dark brown; *Sc* short; male hypopygium very complicated in structure, especially the basistyle; rostral prolongation of the ventral dististyle unusually broad and flattened.

Male.—Length (without head) about 6.5 mm.; wing, 8 mm. Head broken.

General coloration of the thorax dark, pruinose, the coloration of the unique type discolored. Halteres yellow, the knobs dark brown. Legs with the fore coxae dark, the posterior coxae obscure yellow; trochanters yellow; remainder of legs brown. Wings with a brownish tinge; stigma dark brown, its outline irregular; veins dark brown. Venation: *Sc* short, Sc_1 ending opposite the origin of *Rs*, Sc_2 not far from its tip, Sc_1 alone being about one-half *m-cu*; *Rs* arcuated; cell 1*st* M_2 open by the atrophy of *m* in one wing of the type, closed in the other, probably normally closed; *m-cu* close to the fork of *M*.

Abdomen dark brown, the intermediate sternites brighter; hypopygium dark, the large ventral dististyle more yellowish. Male hypopgium (Fig. 2) with

the caudal margin of the ninth tergite (t) very gently emarginate, the lateral lobes darker, sparsely setiferous; a group of setae on the median region. Basistyle (b) of moderate size, the ventro-mesal lobe very long, the surface very densely setiferous, at its base with a smaller lobe that is provided with conspicuous setae which at the apex become modified into flattened, strongly curved, spinous setae; a very small tubercle, tipped with long conspicuous setae, placed at the base of this latter lobe. Ventral dististyle (v) relatively small, fleshy, the rostral prolongation very broad and flattened, shaped as in the figure, the rostral spines short, placed close together; mesal margin of dististyle (Fig. 2, A) basad of the prolongation wih two dense brushes of very long conspicuous setae (omitted from Fig. 2, only the punctures shown, to avoid confusion), in addition to a short tubercle bearing a dense apical brush of setae. Dorsal dististyle (d) a gently curved flattened blade, strongly constricted shortly beyond the base, the tip acute.

Holotype, ♂, Lesser Slave Lake, August 17, 1924 (*Owen Bryant*).

Helius flavipes (Macq.). Bilby, June 22, 1924.

Tricyphona constans (Doane). Lesser Slave Lake, August 17, 1924.

Ula elegans O.S. Bilby, June 17-July 4, 1924.

Epiphragma fascipennis (Say). Bilby, June 22, 1924.

Pseudolimnophila noveboracensis (Alex.). Lesser Slave Lake, August 17, 1924.

Limnophila poetica O.S. Bilby, June 19-July 4, 1924.

Limnophila bryanti sp. n.

General coloration obscure yellow; head with the anterior vertex dark, gray pruinose; wings with a pale yellowish tinge, the costal region a little darker; R_{2+3+4} about one-half longer than *m-cu*; inner end of cell R_3 pointed; abdomen without a distinct dark subterminal ring; male hypopygium with the outer dististyle pale, ending in a small spine and abundant microscopic denticles.

Male.—Length, about 9.5 mm.; wing, 10 mm.

Rostrum brownish yellow, the palpi black. Antennae elongate, in the unique type broken shortly beyond the base; scapal segments brownish yellow; basal two flagellar segments dark brown, the bases narrowly obscure yellow, the segments with conspicuous erect white setae; remainder of antennae broken. Head dark, the vertex heavily gray pruinose, the posterior vertex and occiput abruptly yellow.

Pronotum yellow, a little darker medially. Mesonotal praescutum obscure yellow, with three very ill-defined reddish brown stripes, the surface sparsely pruinose; humeral region more yellowish; pseudo-sutural foveae reddish brown, little evident against the ground-color; scutum pale, the surface sparsely pruinose; scutellum yellow; postnotal mediotergite light gray, more yellowish laterally. Pleura reddish yellow, very sparsely pruinose, the dorso-pleural region clearer yellow. Halteres pale, the knobs infuscated. Legs with the coxae and trochanters yellow; remainder of the legs broken. Wings with a pale yellowish tinge, the costal region a little darker; stigma poorly defined, brownish yellow; a small brown cloud at origin of *Rs*; certain of the veins vaguely seamed with brown. Venation: Sc_1 ending just beyond the fork of *Rs*, Sc_2 at its tip; *Rs* long, angulated and weakly spurred at origin; R_{2+3+4} relatively long, one-half longer than *m-cu*; R_{2+3} about two-thirds R_3 alone; R_{1+2} very short, subequal or shorter

than R_2 alone; cell R_3 pointed at inner end; cell M_1 short; cell 1*st* M_2 long and narrow, *m-cu* at near mid-length.

Abdomen elongate, yellow, the tergites a little darker laterally; no black subterminal ring as in *poetica*; hypopygium pale. Male hypopygium with the outer dististyle gently curved, pale throughout, the apex with a small spine on outer apical angle and abundant microscopic denticles at the truncated apex of the style. Aedeagus small. Gonapophyses appearing as flattened, elongate-triangular blades, the apex acute, the outer margin with about five or six large appressed teeth.

Holotype, ♂, Bilby, June 25, 1924 (*Owen Bryant*).

I name this interesting fly after the collector, Mr. Owen Bryant, who has added most materially to our knowledge of the Oriental and Nearctic Tipulidae. *Limnophila bryanti* bears a great superficial resemblance to *L. poetica* O.S., with which species it was associated in the collection. The structure of the male hypopygium is very distinct.

Limnophila harperi Alex. Bilby, June 17, 1924. The species was described (Insec. Inscit. Menst., 14:23-24; 1926) from the Athabasca Delta, Alberta, the type collected June 18, 1920, by Dr. Francis Harper. The species is very distinct from the other members of the *unica* group in the structure of the male hypopygium.

Limnophila (*Phylidorea*) *platyphallus* Alex. Bilby, June 24, 1924.

Neolimnophila ultima (O.S.). Edmonton, September 5-27, 1924; Lesser Slave Lake, August 17, 1924.

Helobia hybrida Meig. Edmonton, April 30, 1925; Bilby, August 2, 1924; Tofield, October 24, 1924; Lesser Slave Lake, August 17, 1924.

Molophilus soror Alex. A female, Lesser Slave Lake, August 17, 1924.

Erioptera (*Erioptera*) *villosa* O.S. Bilby, July 3-12, 1924.

Ormosia arcuata (Doane). Lesser Slave Lake, August 14, 1924.

A NEW HEMIMENE FROM ALBERTA (EUCOSMIDAE, LEPID.).*

BY J. MCDUNNOUGH,
Ottawa, Ont.

Hemimene bowmanana n. sp.

Head and palpi dark brown sprinkled with gray. Primaries deep brown, somewhat paler in apical region where there is scattered ochreous scaling; two rather obscure whitish vertical streaks about the middle of the inner margin which in the middle of the wing connect with still more obscure oblique streaks from middle of costa which show a slight purplish metallic color; ocelloid region bordered by two broad metallic bars, more or less united above tornus; the contained area is slightly sprinkled with pale ochreous but contains no definite dark streaks; apical area of costa with four short geminate white streaks, the first pair connecting with the inner ocelloid bar by a metallic streak, the middle pairs more or less joined basally by metallic scaling, and the outer pair giving rise to a metallic line which curves to outer margin and ends in a white dot; similar white dots occur at the outer ends of the ocelloid bars; fringes with a dark basal line, followed by

*—Contribution from the Division of Systematic Entomology, Entomological Branch, Dept. of Agric., Ottawa.

a pale area and again darker outwardly, sprinkled with white scaling opposite the above mentioned white dots. Secondaries deep smoky; fringes pale with dark basal line. Beneath dull smoky with white costal streaks of primaries repeated. Expanse 10-11 mm.

Holotype— ♂, Nordegg, Alta., May 31 (K. Bowman); No. 2590 in the Canadian National Collection through the courtesy of Mr. Bowman.

Allotype— ♀, same locality, May 28.

Paratypes—One ♂, ♀, same data, taken in coitu; one ♀, Hopedale, Labrador, July 8, 1923.

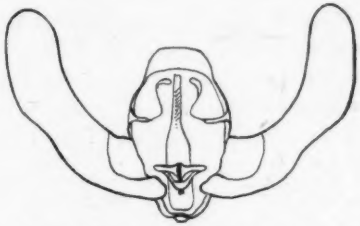

Fig. 1. Male genitalia of *Hemimene bowmanana.*

This species is a typical *Hemimene,* according to Heinrich's revision, and quite different from the four described North American species belonging to this genus; it again exemplifies the similarity between the faunas of two such widely separated regions as Labrador and Nordegg. I take much pleasure in naming the species after the collector.

Mailed September 30th, 1927.